Covid-19 Impact on North American Oil and Natural Gas

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U.S. natural gas flow, 2019

trillion cubic feet

from natural gas wells 6.96
from crude oil wells 6.88
from coalbed wells 1.04
from shale gas wells 25.81

Source: EIA (April 29, 2020)
First Look at COVID-19 Impact

- U.S. recession, with 3rd quarter trough
- U.S. Industrial production lagging, with 4th quarter trough
- U.S. Gas demand falling on a weather adjusted basis
- U.S. Gas production declines accelerating in 3rd quarter
- Whether a “V-Shape” or “U-Shape” there will be structural changes

Source: EIA, STEO (April 6, 2020)
“Rewriting the Playbook”

• **Gas Demand Impacts – Short-Medium-Long**
  • Residential
  • Commercial
  • Industrial
  • Electric Generation
  • LNG

• **Gas Supply Impacts – Short-Medium-Long**
  • Associated Gas Production
  • Dry Gas Production
  • Imports

• **Market Psychology Impacts - Short-Medium-Long**
  • Price Signals
Gas Demand Impacts – Short-Medium-Long

• Residential = f(HDDs, use intensity, gas price, technology, policy)
  • ST - Working and schooling from home = **higher demand**
  • MT - Continuation of work/school from home trends?
  • LT – Secondary effects – climate change, fossil fuel use, etc.
    o Moves to/from cities?
    o Fossil fuel legislation?

• Commercial = f(floor space, gas price, technology, policy)
  • ST – Reduction of retail and other commercial utilization = **lower demand**
  • MT – How much retail will return?
    o Home vs. central office
  • LT – Alternate uses for malls/retail/offices?
    o Shift to online purchases

• Industrial = f(GDP, energy intensity, gas price, international trade)
  • ST – Plant closures and reduced utilization (Refining, Steel) = **lower demand**
  • MT – Gas price impact on gas-intensive manufacturing competitiveness?
  • LT – Geopolitics, new supply chains, industrial policy
U.S. Gas Demand Impacts – Short-Medium-Long (cont.)

• **Electric Generation = f(DDs, gas & coal prices, GDP, policy)**
  • ST – Plant closures and reduced utilization (Aluminum, Steel, Chemicals) = **less demand**
    o Low gas price = **higher demand**
    o Higher gas prices = **lower demand**
  • MT – Price impact on plant dispatch, capacity mothballing?
  • LT – Easing/strengthening renewable/fossil fuel policies?
    o More manufacturing insourcing, new supply chains?

• **LNG = f(Asia/Europe/Latin Am demand, gas and oil price, world GDP)**
  • ST – European full + lower Asia and Latin American GDP = **lower exports than 20Q1**
  • MT – Price impact versus other LNG exporters? Oil price? = **less optimistic outlook**
  • LT – Changes to renewable/fossil fuel policies? Geopolitics?
U.S. Natural Gas Production Trends

- $3.00/MMBtu gas and $60/B oil provided a rosy supply picture
- Falling gas prices in 2019-20 soured gas drilling, but oil at $50-$60 remained economic
- In early 2020 the Permian was producing >12 Bcfd and associated gas was ~20% of total gas production.
- Today the 12-month NYMEX WTI strip is ~$26/B and Henry Hub is ~$2.60/MMBtu

Source: CME and EIA
Gas Supply Impacts – Short-Medium-Long

• **Associated Gas Production**
  • ST – A flat-to-decline trend, but the Permian was flaring a lot of gas
  • MT – Low oil prices and the rig count plunge suggests **2023 at earliest** for rebound
  • LT – Dependent on oil price trajectory

• **Dry Gas Production**
  • ST – Prices and drilling have trended downward for 30 months = **declining production**
  • MT – Futures remain too low to incentivize drilling, but lower production = flat-to-increasing
  • LT – Export contacts and small price elasticity = **higher production**

• **Imports**
  • ST – Surplus Canadian gas and captive U.S. markets = no change
  • MT – Tighter U.S. market and surplus Canadian gas = **higher imports**
  • LT – **No sustained increase** unless U.S. sees flat-to-declining production
Pre and Current COVID-19 Price Signals

- Market became bearish due to a mild winter and robust associated gas growth
- By early March near term gas prices were at the lowest since the 1990s
- Mid March oil price plunge signaled lower associated gas output
- Current price signals gas-to-coal switching beginning in Q3, but bearish LT

Source: CME
Market Psychology – Short-Medium-Long

• **Current NYMEX Futures**
  - **ST** – Growing optimism for a tighter supply-demand balance = small upward trend
  - **MT** – Hedging bets on U.S. and world GDP rebound = minimal incentive for new investment
  - **LT** – Assumes an oil price rebound and more associated gas = minimal incentive for new investment

• **Price Risks**
  - **ST** – V-shape recovery and larger production declines = higher gas prices
    - Deeper recession and smaller production declines = lower gas price
  - **MT** – Lower oil price = higher gas price
    - Reluctant investors/bankruptcies = higher gas price
  - **LT** – Higher gas and oil price = higher production = lower gas price
    - Greater electrification U.S. and worldwide = higher gas price
Canada & Mexico Issues

- GDP declines = less gas demand
- Large negative impact for Canada given oil sands use. More exports to U.S.?
- But Mexican economy more dependent on oil price = bigger GDP hit

Source: EIA, BP Statistical Review, LDEC
GLOSSARY and NOTES

• **AEO:** Annual Energy Outlook. Long term energy forecasts published annually by the EIA.
• **Associated Gas:** or Associated Dissolved Gas. Gas produced in conjunction with crude oil.
• **Bcf:** Billions of Cubic Feet. **Bcfd:** Billions of Cubic Feet per Day.
• **CME:** Chicago Mercantile Exchange. Data for both NYMEX Henry Hub Natural Gas Futures (**NG**) and Crude Oil Futures (**CL**) are by permission from CME.
• **Degree-Day (DD):** A unit used to specify heating or cooling requirements. It is typically calculated as the difference between or 65°F and the average daily outside temperature. **CDD:** Cooling Degree Day. **GWHDD:** Gas-weighted Heating Degree Day.
• **EIA:** U.S. Energy Information Administration.
• **LDEC:** Les Deman Energy Consulting.
• **LNG:** Liquified Natural Gas. Methane cooled to -260°F to facilitate shipping by tanker, truck or rail.
• **Marketed Gas Production:** Production from reservoirs less gas used for repressuring, non hydrocarbon gases and quantities vented and flared. **Dry Production:** Marketed production less extraction loss from processing the gas to remove NGLs.
• **NYMEX:** New York Mercantile Exchange.
• **STEO:** Short Term Energy Outlook. Comprehensive 24-month forecast published monthly by the EIA.